

Atom-based Artifacts and Atomic Imaging Tool Development

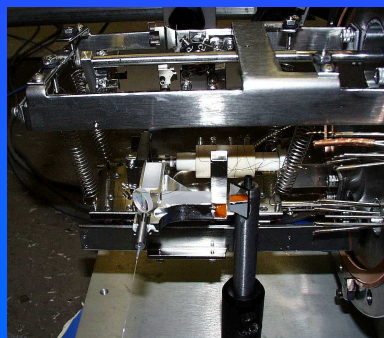
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2001 Deliverables

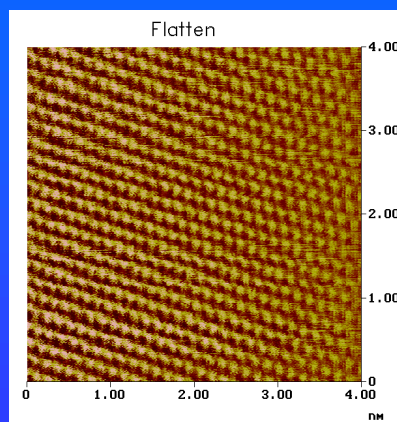
- Develop the methods to prepare photolithographically patterned three-dimensional structures in silicon adequate for atom-based dimensional metrology in collaboration with SEMATECH.
- Develop the methods for preparation of surfaces with long range atomic order in silicon and improve wet chemistry surface preparation methods for use in dimensional measurements on the atomic scale.

Customers and Collaborators

- International SEMATECH
- Office Of Microelectronics Programs



Measurements of atoms on semiconductor surfaces



First UHV-STM/Interferometer Graphite Data

FY 2000 Accomplishments

- Obtained routine reconstruction of Si (111) surfaces with long range atomic order at high temperatures.
- Developed wet Si processing methods to lower atomic reconstruction temperatures on Si etched structures.
- Correlate atomic resolution imaging of FIFEM tips with atomically resolved artifacts. Develop and publish new model of atomic dimension tip shapes.
- Fabricated new linewidth photomask and have wafers fabricated at SEMATECH specifically for linewidth metrology and atom counting.
- Designed the hardware and installed the components on the UHV-STM to enable the first direct measurements with interferometry of lateral atomic spacings.
- Completed the assembly of the vacuum suitcase UHV segments and demonstrated UHV transportation of GaAs atom-based metrology sample from Bldg 220 to Bldg 225.